

Illinois Department of  
**Public  
Health**

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DATE: June 14, 2002

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FROM: Ken Runkle *ROR*  
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IDPH-Environmental Toxicology

RE: Eagle Zinc Company Site  
Hillsboro, Illinois

EPA Region 5 Records Ctr.



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Please find enclosed a draft of the health consultation for the above-mentioned site. If you wish to make any written comments, please forward them to me **by July 19, 2002**. After all comments have been addressed and needed changes made, the final version of this document will be sent to the Agency for Toxic Substances and Disease Registry for release.

If you have any questions, please call me at 217-782-5830.

cc: Cathy Copley  
IDPH Edwardsville Office

**Health Consultation**

**Eagle Zinc Company**

**Hillsboro, Montgomery County, Illinois**

**EPA Facility ID# ILD 980606941**

**June 2002**

**Prepared by:**

**Illinois Department of Public Health  
under cooperative agreement with the  
Agency for Toxic Substances and Disease Registry**

## **Purpose**

The U.S. Environmental Protection Agency (USEPA) requested a health consultation for the Eagle Zinc Company site from the Illinois Department of Public Health (IDPH). The purpose of this health consultation is to determine if a public health hazard exists due to actual or potential exposure to hazardous materials or conditions at the site. The Eagle Zinc site in Hillsboro, Illinois is being considered for inclusion on the National Priorities List (NPL) by USEPA. According to the USEPA project manager, a remedial investigation and feasibility study (RI/FS) will begin in the summer of 2002. This health consultation is based on the data currently available.

## **Background and Statement of Issues**

### **Location**

The city of Hillsboro is the county seat of Montgomery County with a population of 5,515 according to 2000 census data (Figure 1). The site is about 132 acres in size and is on the east side of Hillsboro, north of State Route 16. About 13 acres of the site is covered with buildings. Two ponds are located on the site, one in the southeast portion and one in the southwest portion.

The nearest home is part of a residential area about 200 feet southwest of the site. The nearest school is Burbank Grade School, which is about 0.25 miles southwest of the site. Homes to the east of the site are in an area known as Schram City. A glass company and trucking firm are northeast of the site. North of the site is a small subdivision and a few small businesses. Lake Hillsboro and an accompanying park have been developed north of the site, about 1 mile from the northern border of Eagle Zinc. A country club owns lakeside property. Available activities include fishing, boating, camping, and swimming. Low-income multifamily public housing units, a few mobile homes, and privately-owned single-family homes adjoin the western site property line.

### **History**

Construction of the zinc facility began around 1910 and early operations reportedly began in 1914. Eagle Picher operated the plant until around 1980. In addition to zinc metal and zinc oxide, the former operators of the site produced lead pigment from lead ores; however, manufacture of lead products stopped following the federal ban on leaded residential paint in the late 1970s. Current specifications for the zinc oxide product do not allow more than 0.06% lead content. This is the same concentration determined by the U.S. Consumer Product Safety Commission for the maximum allowable lead concentration in new residential paints.

An Illinois Environmental Protection Agency (Illinois EPA) inspection in 1973 found that scrap metal, furnace residue and storage of metal-bearing material sorted by percentage of zinc was stored on the ground. At one time, much of the southwest corner of the property was covered

with piles of a black residue. Reportedly, these materials were used to surface roads at the facility. At times, efforts have been made to ship residue to other facilities to recover zinc, copper, and carbon, but these efforts are costly and limited in times of low market values.

Sherwin-Williams operated the facility from around 1980 to 1984. Since 1984, the Eagle Zinc Company, a division of T.L. Diamond & Company, Inc. has operated the facility. Since the early 1980s, the method of making zinc oxide uses zinc feedstock and anthracite coal. The fuel and feed stocks are delivered to the site by rail or by truck. Feed stocks vary in quality and may be crude or lower-quality zinc byproducts from other manufacturing facilities.

In 1981 and 1982, Illinois EPA sampled surface water and determined that elevated levels of zinc, cadmium, iron, lead, and copper were migrating off the site. This finding resulted in Sherwin-Williams Company having approximately 36 million pounds of furnace waste removed for reclamation. This material had covered about 10 acres of the site. Raw materials, product, and waste have regularly been placed on the ground for on-site storage and disposal. No liners or dikes were constructed under or around these piles. Much of the material was at the southwest corner of the site. The spent materials have included rotary furnace residue, rotary furnace clean out, carbon plant hutch, muffle dross, building demolition debris, spent fire brick, silica-slugs (zinc silicates, zinc ferrites, and iron silicates), and carbonaceous iron slag.

In 1993, Illinois EPA sampled soil, process wastes, and sediments. Some soil samples were collected from residential properties and school yards. Sediments were analyzed for organic and inorganic compounds, pesticides, and metals. Soil and solid wastes were analyzed for metals and inorganic compounds only. A background soil sample was collected from a residential property in Butler, Illinois. A background sediment sample was taken from a drainage way south of Hillsboro. Another smelting facility is about a mile south of Hillsboro and this facility may have contributed to metals detected in the background sediment sample.

Illinois EPA shared the analytical results for soil samples collected from homes near the site with IDPH. IDPH reviewed the data, evaluated any public health hazards, and mailed letters interpreting the results to the residents in February 1994. Manganese was identified as exceeding a public health guideline for children's soil exposure.

Also in 1993, sediment samples in surface drainage areas were collected on and off the site. Following an interim court order, plans were developed to collect samples during precipitation events to measure some contaminant migration.

On September 13, 1994, the USEPA Chief of Emergency Response concluded that the site did not require a time critical or non-time critical removal action; however, lead levels in material on the site remained a concern.

If any private wells are being used in the area, it is likely that they are outside the city limits. The facility and households within the city limits are supplied with municipal water. As a result

of a court order, the company installed groundwater monitoring wells in the late 1990s and sample collection began in late 1998.

The Illinois EPA Division of Water Pollution Control collected storm water samples in January 1998. Samples were collected from a discharge channel of the southwest pond and from the intermittent stream that drains the northeast portion of the site. An upstream sample was also collected. Surface water and storm water samples have been collected regularly during precipitation events since 1998 at two sampling locations at the edge of the plant property to determine the extent of the migration of metals in storm water.

On-site residues were sampled in May 1998 and analyzed for lead and cadmium concentrations to help characterize the different waste piles. One pile had a lead concentration of 50,290 parts per million (ppm). The highest cadmium concentration was 66.7 ppm. A few sediment samples have contained PCBs.

### **Current Status**

Current production generates approximately 5 tons of rotary furnace residue per day and 400 tons of furnace residue each year is removed from the equipment. Besides application as a fungicide, the zinc oxide produced is used in pigments, ceramic glazes, adhesives, and rubber-making (vulcanization process). In the past, many buildings were on the site, with as much as 26 acres covered with buildings and associated structures. Currently, the main buildings include an office building-laboratory, a storage building, and a furnace-bag house where zinc oxide is produced. The plant also adds zinc coatings to shingles to retard fungal growth. The scale of current operations is small relative to past production.

Wastes generated at the facility laboratory are discharged to the public sanitary sewer system, and a small amount of equipment waste oil is collected by a recycling business. These wastes are small compared with the large piles of metal-based residues that have been regularly generated as byproducts of the main processes. Eagle Zinc maintains an air pollution control permit for two rotary furnaces with baghouses, one waelzling furnace, one rotary dryer, one muffle furnace door hood and two propane storage tanks.

Ponds, wetlands, and surface water exist on the site property. Two ponds collect surface runoff on the southern end of the property. The slight sloping area topography drains to the west. From there, surface water moves toward the south until captured by the pond in the southwest corner. This pond was formed by damming the drainage with solid residue from the facility. Before the construction of a public swimming pool in Hillsboro, residents reportedly were allowed to swim in a southwestern pond. Inspectors have reported breaches in the dam and that runoff is deposited into unnamed tributaries of Middle Fork Shoal Creek. Runoff also occurs at the northeast portion of the site to an unnamed tributary of Lake Hillsboro, about 0.5 miles from the site. Illinois EPA staff has determined that the site does not appear to affect the area municipal water supply, which originates from lakes north of the site.

In 1998, an interim court order was signed, and environmental sampling data is being generated on a regular basis. In December 2001, USEPA signed a consent order with T.L. Diamond, Sherwin-Williams and Eagle-Picher to investigate and assess the extent of any contamination at the site. A remedial investigation and feasibility study (RI/FS) will begin in the summer of 2002 and should be completed in 2004. USEPA has invited IDPH staff to participate in future site visits and activities.

### **Site Visit**

IDPH staff visited the site most recently on May 9, 2002. A public road cuts through the facility. Vegetation on the site appeared to be distressed. Children's outdoor play equipment was observed on the properties along 17th Street in Schram City. The site is easily accessed since fencing does not completely enclose the area.

## **Discussion**

### **Chemicals of Interest**

IDPH compared the results of the available environmental samples with the appropriate comparison values to select chemicals for further evaluation for exposure and possible carcinogenic and non-carcinogenic health effects. Chemicals found at levels greater than comparison values or those for which no comparison values exist were selected for further evaluation. A discussion of each comparison value used is found in Attachment 2. IDPH assumed that the samples were collected and handled properly and that appropriate analytical techniques were used.

The chemicals of interest in soil, surface water, and sediment are arsenic, barium, cadmium, cobalt, copper, lead, manganese, and zinc. The only chemical of interest detected in residential soil was manganese.

### **Exposure Assessment**

An exposure pathway consists of a source of contamination, environmental media and transport mechanisms, a point of exposure, and a receptor population. Exposure to a chemical may have occurred in the past, may be occurring now, or may occur in the future. When all these elements linking the chemical source to an exposed population are known, a completed exposure pathway exists. When one of these elements is missing, a potential exposure pathway exists.

The persons who may have been exposed to site-related chemicals in the past, present, or future are site workers and nearby residents. Exposures to inorganic chemicals can occur by ingestion and inhalation of contaminated soil and inhalation of dust from the site.

## **Residential Soil**

Chemicals in residential soil are a completed exposure pathway. IDPH assumed that children could be exposed to the highest levels found in residential soil while playing and would ingest 200 milligrams of soil daily, 10 months per year.

Based on this exposure scenario, no adverse health effects would be expected from exposure to chemicals in residential soil.

## **On-site Soil, Sediment, and Waste**

Exposure to chemicals in on-site soil, sediment and wastes are a completed exposure pathway for workers and trespassers. IDPH assumed adult workers would ingest dirt and dust while working 5 days per week, 50 weeks per year. We assumed that no personal protective equipment is used while contacting the soil and waste. For trespassers, we assumed a 12-year-old child would come onto the site and contact soil and waste 2 days per week for 20 weeks per year.

Based on these exposure scenarios, no adverse health effects would be expected for adult workers or trespassers contacting on-site soil, sediment, and waste.

## **Workers**

Workers may inhale metals while the facility is operating. During the years of lead pigment production, some blood testing of workers occurred, but this data is not available. Breathing too many metal particles or dust contaminated with metals can cause irritation of the lungs. This can be especially problematic for those with respiratory disorders or allergies. In addition, it can increase the chances of lung infection or make breathing difficult. This phenomenon can occur for many metals as well as mixtures of particles. Some refer to this condition as "metal fume fever." Metal fume fever has occurred as a result of high-dose exposures in other occupational settings, but we do not know if it has occurred at Eagle Zinc. Little is known about the long-term effects of breathing metallic dusts. No airborne particulate data exists for this site.

## **Surface Water**

Past exposures to contaminated water and sediment were likely to have occurred when residents would swim in surface water on the site. This practice no longer occurs. Sampling of sediments and storm water has shown that they contain elevated levels of metals, but we cannot reconstruct the past exposures.

## **Groundwater**

The closest well identified from records reviewed in 1993 was about 0.5 miles east of the site, outside the city limits. The facility and households within the city limits are supplied with public water. Illinois EPA staff reviewed private well records maintained by the Illinois State

Geological Survey and found that the existing private wells were approximately 50 feet deep, below a layer of clay that exists at a depth of 12 to 18 feet. Because metals are not mobile in soil or very soluble in water, the existence of a confining clay layer, and the distance from the site to the closest private well, it is unlikely that site-related chemicals will affect off-site groundwater.

### **Community Health Concerns**

On May 9, 2002, USEPA hosted a public meeting to provide persons with an update about the site and to discuss the overall work plan and cleanup process. About 60 persons attended. The main community concerns were about procedural and communication issues and current operations.

### **Child Health Initiative**

IDPH recognizes that children are especially sensitive to some contaminants. For this reason, IDPH included children when evaluating exposures to site-related chemicals. Manganese was the only metal found at elevated levels in residential soil, but no adverse health effects would be expected for children while playing and ingesting 200 milligrams of soil daily, 10 months per year.

### **Conclusions**

Based upon the available data and information reviewed, the Illinois Department of Public Health concludes that under current conditions this site does not pose a public health hazard to the residents of Hillsboro. Years of processing and smelting of primary ores for zinc and lead and fueling furnaces with coal has resulted in a large accumulation of metals in on-site soil, waste and sediments, but not at levels that would cause adverse health effects based on the available data and our trespasser exposure scenario.

### **Recommendations and Public Health Action Plan**

Although current data do not show that a public health hazard exists, limiting current exposures would be prudent and prevent future exposures to materials stored at the site. Careful handling of site wastes should prevent undue exposures for workers and nearby residents. IDPH recommends that USEPA prevent public access to the site during any remediation activity. Additional environmental sampling results will be generated as USEPA begins an RI/FS this year. IDPH will review and assess the health significance of these data.

## **Report Prepared by:**

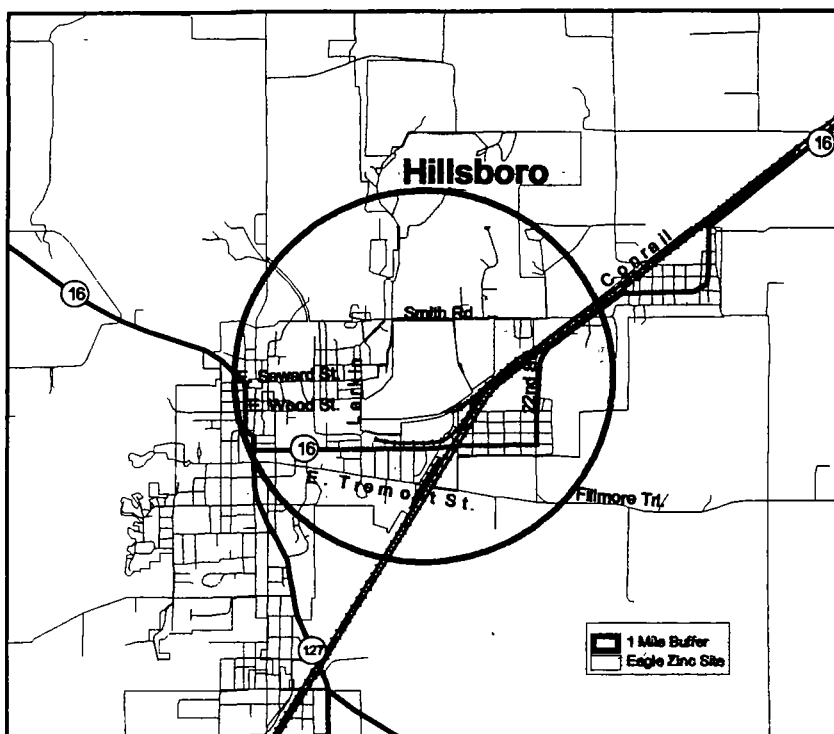
Catherine Copley  
Environmental Health Specialist  
Illinois Department of Public Health

## **References**

1. Illinois Environmental Protection Agency. Division of Land Pollution Control Freedom of Information file inspection on September 19, 1994 and December 10, 2001.
2. Illinois Environmental Protection Agency. Office of Chemical Safety. A summary of Selected Background Conditions for Inorganics in Soil. August 1994.
3. Agency for Toxic Substances and Disease Registry. Toxicological Profiles for Arsenic, Cadmium, Cobalt, Copper, Lead, Manganese, Nickel, Silver, Thallium, and Zinc. U. S. Health and Human Services, Atlanta, Georgia.

# Eagle Zinc Company

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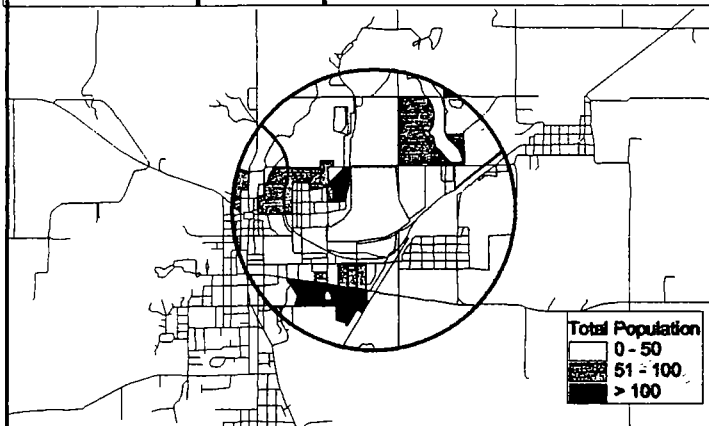


Montgomery County  
Illinois

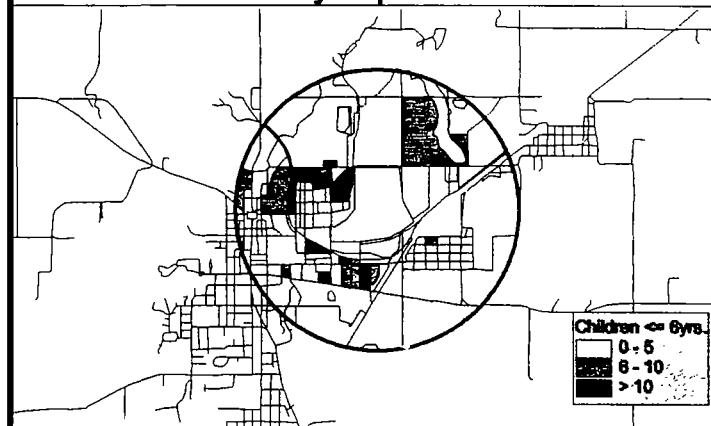


Summary Statistics Within One Mile of the Site	
Total Number of People	3690
Children Aged 6 and Younger	377
Adults Aged 65 and Older	810
Females Aged 15-44	771
Younger Than 18 Years	954
18 Years and Older	2736
White	3620
Black	39
Asian or Pacific Islander	13
American Indian, Eskimo, Al	5
Other Race	13
Hispanic Origin	39

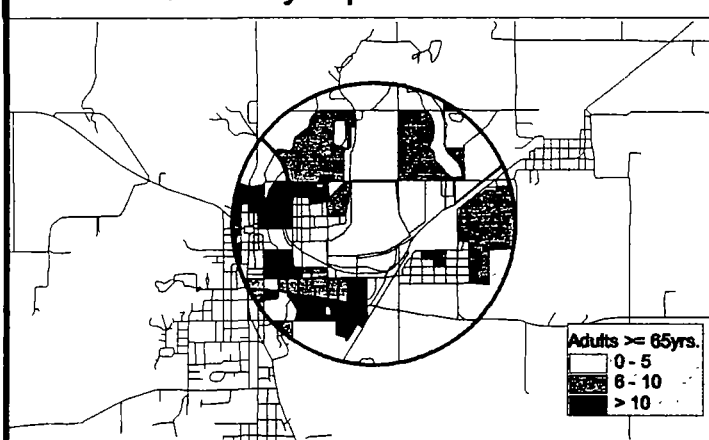
Population per Census Block



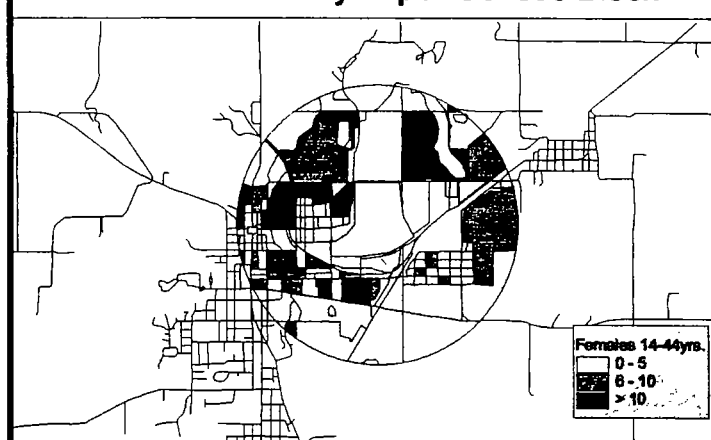
Children <= 6 yrs. per Census Block



Adults >= 65 yrs. per Census Block



Females 14-44 yrs. per Census Block



0.3 0 0.3 Miles



## **Comparison Values Used In Screening Contaminants For Further Evaluation**

Environmental Media Evaluation Guides (EMEGs) are developed for chemicals based on their toxicity, frequency of occurrence at National Priorities List (NPL) sites, and potential for human exposure. They are not action levels but are comparison values. They are developed without consideration for carcinogenic effects, chemical interactions, multiple route exposure, or exposure through other environmental media. They are very conservative concentration values designed to protect sensitive members of the population.

Reference Dose Media Evaluation Guides (RMEGs) are another type of comparison value. They are developed without consideration for carcinogenic effects, chemical interactions, multiple route exposure, or exposure through other environmental media. They are very conservative concentration values designed to protect sensitive members of the population.

Cancer Risk Evaluation Guides (CREGs) are estimated contaminant concentrations based on a probability of one excess cancer in a million persons exposed to a chemical over a lifetime.

Maximum Contaminant Levels (MCLs) have been established by USEPA for public water supplies to reduce the chances of occurrence of adverse health effects from use of contaminated drinking water. These standards are well below levels for which health effects have been observed and take into account the financial feasibility of achieving specific contaminant levels. These are enforceable limits that public water supplies must meet.

Lifetime Health Advisories for drinking water (LTHAs) have been established by USEPA for drinking water. They represent the concentrations of chemicals in drinking water that are not expected to cause any adverse, non-carcinogenic effects over a lifetime of exposure. These are conservative values that incorporate a margin of safety.